

REMARKS

Applicants respectfully request further examination and reconsideration of the instant case in view of the instant response. Claims 1, 11 and 18 have been amended herein. Claims 1-23 remain pending in the case. No new matter has been added as a result of the claim amendments.

Claim Rejections35 U.S.C. §103

Claims 1-5, 8, 10-12, 14, 16-19, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn, U.S. Patent No. 6,962,829 B2, hereafter referred to as Glenn, in view of Primavera, U.S. Patent Application No. 2002/0044423 A1, hereafter referred to as Primavera. The rejection is respectfully traversed for the following rational.

Embodiments of the present invention include a flexible electrical connector in accordance with the invention that transitions a signal from a transmission line on a first surface to a transmission line on an opposing surface while avoiding degradation of signal integrity. The flexible connector includes a flexible circuit having vias disposed in locations that reduce discontinuity in a ground plane separating transmission lines. By reducing the discontinuity of the ground plane separating the transmission lines, degradation of signal integrity in the flex circuit can be avoided. Furthermore, disposing vias at a location of electrical discontinuity combines discontinuity in the flex circuit, thus further avoiding degradation of signal integrity.

In particular, currently amended Claim 1 recites: (emphasis added)

A flexible circuit having vias disposed to minimize discontinuity in a ground plane separating opposing transmission lines, said flex circuit comprising:

a first type of electrical connection pad array disposed on a first surface of said flexible circuit, and electrically coupled to a first transmission line;

a second type of electrical connection pad array disposed on a second surface of said flexible circuit, and electrically coupled to a second transmission line wherein said second type of electrical connection pad array has a higher areal density than said first type of electrical connection pads and said first type of electrical connection pad array is offset from said second type of electrical pad array; and

vias disposed closer to said first type of electrical connection pad array and extending through a ground plane to provide for electrically coupling said first transmission line and said second transmission line, such that said vias minimize discontinuity in said ground plane.

Applicants respectfully contend that Glenn and Primavera, alone or in combination, fail to teach or suggest subject matter recited in amended independent Claim 1, amended Independent Claim 11 and amended Independent Claim 18.

Applicants have reviewed Glenn and assert that Glenn fails to teach or suggest many of the claimed limitations of the present invention. For instance, Glenn fails to teach or suggest a flexible circuit. In fact, Glenn teaches away from a flexible circuit in the abstract, "IC chip including bonding pads and first substrate surface are then encapsulated." Glenn later teaches in column 7, lines 47-50, "encapsulant such as Dexter Hysol 4450 or 4451 or its equivalent." Applicants understand Dexter Hysol to be an epoxy material that is not flexible. In fact, the epoxy used by Glenn has a limited working time before curing to an inflexible state. By encapsulating the circuit in an epoxy resin, Glenn teaches away from a flexible circuit, as claimed by embodiments of the present invention. By teaching an encapsulated circuit, Applicants assert that Glenn never intended the circuit to be flexible.

In addition to teaching away from a flexible circuit, Glenn teaches away from "vias disposed to minimize discontinuity in the ground plane," as claimed. In fact, Glenn is silent with respect to via placement for reducing ground plane discontinuity. Furthermore, Glenn teaches away from "vias disposed closer to the first type of electrical connection pads than the second type of electrical connection pads," as claimed. In accordance with embodiments of the present invention, vias are located closer to the first type of electrical connector (which has a lower areal density than the second type) than the

second type of electrical connector to reduce the discontinuity of the ground plane.

Glenn further fails to teach or suggest "said first type of electrical pad array is offset from said second type of electrical pad array," as claimed in Independent Claims 1, 11 and 18. In accordance with embodiments of the present invention, the first type of electrical pad array does not overlap the second type of electrical pad because they are offset. In fact, Glenn teaches away from this claimed limitation in Figures 16 and 17 where pads 23 on the top side overlap pads 27 on the bottom side. With Glenn the two types of connector pads are not offset, as claimed.

Primavera fails to remedy the deficiencies of Glenn. Primavera may purport to teach a method and apparatus for mounting and packaging electronic components, however, Primavera fails to teach or suggest "vias disposed to minimize discontinuity in the ground plane," as claimed. In fact, Primavera is silent about a ground plane and/or discontinuities in a ground plane.

Furthermore, Applicants fail to understand the motivation to combine the teachings of Glenn with the teachings of Primavera. As in *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1385 (Fed. Cir. 2001) "In holding an invention obvious in view of a combination of references, there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in the way that would produce the claimed invention." Glenn fails to teach or suggest a flexible circuit, as claimed by embodiments of the present invention. Therefore, Applicants do not understand the motivation to combine the teachings of Glenn with the teachings of Primavera.

For this rational, neither Glenn nor Primavera, alone or in combination, teach or suggest the claimed limitations of Independent Claims 1, 11 and 18. As such, Claims 1-5, 8, 10-12, 14, 16-19, 21 and 23 are patentable over Glenn in view of Primavera. Applicants respectfully request allowance of these claims.

Claims 9, 15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn in view of Primavera as applied to Claims 1, 11 and 18 above, in further view of Kuijk, U.S. Patent No. 6,396,712, hereafter referred to as Kuijk. The rejection is respectfully traversed for the following rational.

As stated above, Glenn and Primavera fail to teach or suggest "vias disposed to minimize discontinuity in the ground plane," as claimed. Kuijk fails to remedy the deficiencies of Glenn and Primavera. Kuijk may purport to teach a method and apparatus for coupling circuit components, however, Kuijk fails to teach or suggest "vias disposed to minimize discontinuity in the ground plane," as claimed. For this rational, Claims 9, 15 and 20 are patentable over Glenn-Primavera in view of Kuijk. Applicants respectfully request allowance of Claims 9, 15 and 20.

Claims 6, 7, 13 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn in view of Primavera as applied to Claims 4, 5, 12 and 21 above, in view of Strandberg, U.S. Patent Application No. 2002/0139566 A1, hereafter referred to as Strandberg. This rejection is respectfully traversed for the following rational.

As stated above, Glenn and Primavera fail to teach or suggest "vias disposed to minimize discontinuity in the ground plane," as claimed. Strandberg fails to remedy the deficiencies of Glenn and Primavera. Strandberg may purport to teach printed wiring board with controlled line impedance, however, Strandberg fails to teach or suggest "vias disposed to minimize discontinuity in the ground plane," as claimed. For this reason, Claims 6, 7, 13 and 22 are patentable over Glenn-Primavera in view of Strandberg. Applicants respectfully request allowance of Claims 6, 7, 13 and 22.


CONCLUSION

In light of the above listed remarks, reconsideration of the amended Claims is requested. Based on the arguments presented above, it is respectfully submitted that Claims 1-23 overcome the rejections and objections of record and, therefore, allowance of Claims 1-23 is earnestly solicited.

Should the Examiner have a question regarding the instant response, the Applicants invite the Examiner to contact the Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

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